### April 2001



# FDP7042L / FDB7042L N-Channel Logic Level PowerTrench<sup>®</sup> MOSFET

### **General Description**

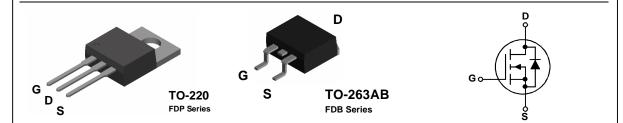
This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for "low side" synchronous rectifier operation, providing an extremely low  $R_{\text{DS}(\text{ON})}$ .

### **Applications**

- Synchronous rectifier
- DC/DC converter

### Features

- 50 A, 30 V.  $R_{DS(ON)} = 9 \ m\Omega \ @ V_{GS} = 4.5 \ V$  $R_{DS(ON)} = 7.5 \ m\Omega \ @ V_{GS} = 10 \ V$
- Critical DC electrical parameters specified at elevated temperature
- High performance trench technology for extremely low  $R_{\text{DS}(\text{ON})}$
- 175°C maximum junction temperature rating



### Absolute Maximum Ratings T<sub>A</sub>=25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
V <sub>DSS</sub>	Drain-Source Voltage		30	V
V <sub>GSS</sub>	Gate-Source Voltage		± 12	V
ID	Drain Current – Continuous	(Note 1)	50	A
	– Pulsed	(Note 1)	150	
P <sub>D</sub>	Total Power Dissipation @ T <sub>C</sub> = 25°C		83	W
	Derate above 25°C		0.48	W∘C
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Junction Temperature Range		-65 to +175	°C

# Thermal Characteristics

$R_{ ext{ heta}JC}$	Thermal Resistance, Junction-to-Case	1.8	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

## Package Marking and Ordering Information

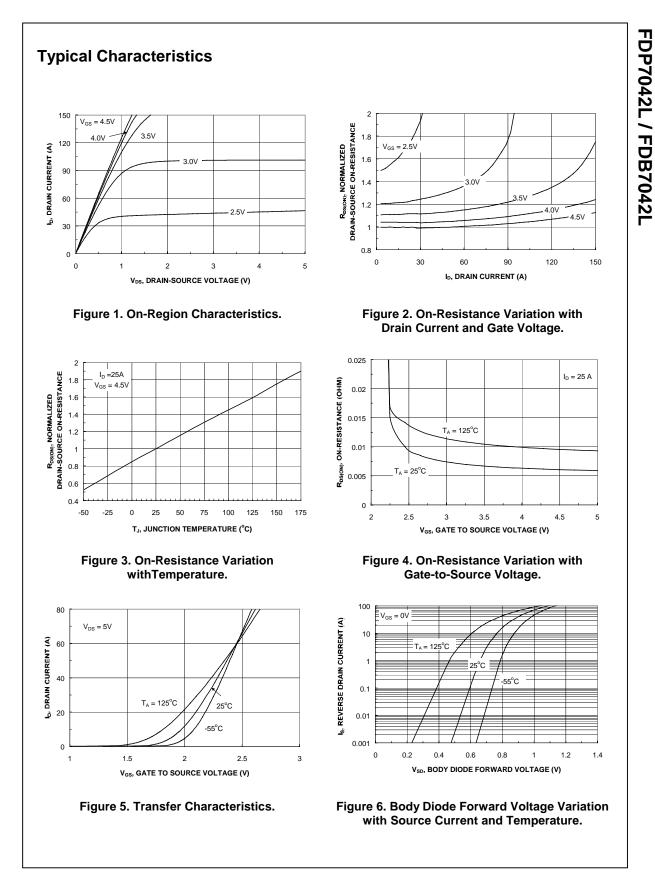
Device Marking	Device	Reel Size	Tape width	Quantity
FDB7042L	FDB7042L	13"	24mm	800 units
FDP7042L	FDP7042L	Tube	n/a	45

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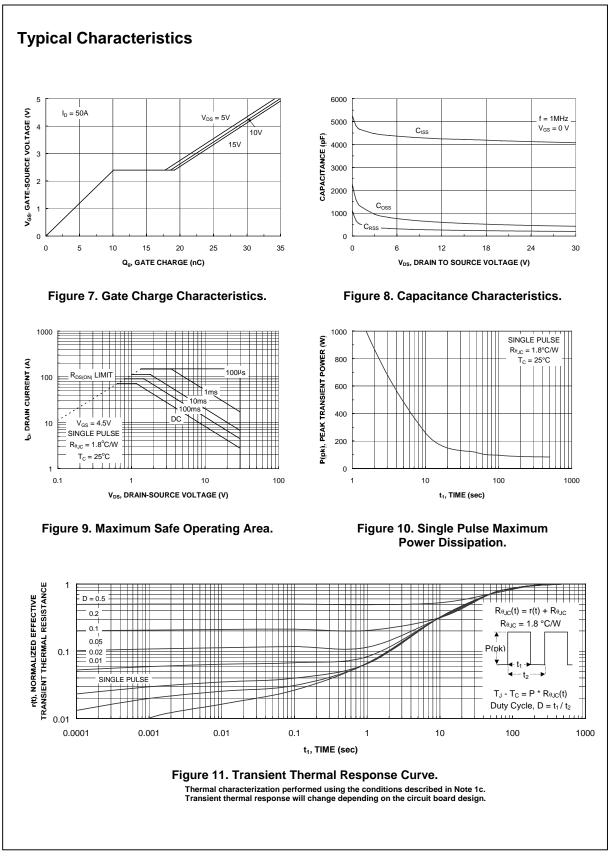
Symbol	Parameter	Test Conditions	Min	Тур	Max	Units
Off Char	acteristics	1				
BV <sub>DSS</sub>	Drain–Source Breakdown Voltage	$V_{GS} = 0 V, I_D = 250 \mu A$	30			V
<u>ΔBVdss</u> ΔTj	Breakdown Voltage Temperature Coefficient	$I_D$ = 250 µA, Referenced to 25°C		24		mV/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	$V_{\text{DS}} = 24 \text{ V}, \qquad V_{\text{GS}} = 0 \text{ V}$			1	μA
I <sub>GSSF</sub>	Gate-Body Leakage, Forward	$V_{GS} = 12 \text{ V}, \qquad V_{DS} = 0 \text{ V}$			100	nA
I <sub>GSSR</sub>	Gate-Body Leakage, Reverse	$V_{GS} = -12 \text{ V} \qquad V_{DS} = 0 \text{ V}$			-100	nA
On Char	acteristics (Note 2)					
V <sub>GS(th)</sub>	Gate Threshold Voltage	$V_{DS} = V_{GS}$ , $I_D = 250 \ \mu A$	0.8	1.2	2	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D$ = 250 µA, Referenced to 25°C		-4.1		mV/°C
R <sub>DS(on)</sub>	Static Drain–Source On–Resistance			6.2 5.5 9.6	9 7.5 16	mΩ
I <sub>D(on)</sub>	On-State Drain Current	$V_{GS} = 4.5 V$ , $V_{DS} = 10 V$	60			А
<b>g</b> <sub>FS</sub>	Forward Transconductance	$V_{DS} = 5V$ , $I_D = 25 A$		117		S
Dynamic	Characteristics					
Ciss	Input Capacitance			2418		pF
Coss	Output Capacitance	$V_{DS} = 15 \text{ V},  V_{GS} = 0 \text{ V},$		549		pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f = 1.0 MHz		243		pF
Switchir	g Characteristics (Note 2)					
t <sub>d(on)</sub>	Turn–On Delay Time			21	34	ns
tr	Turn–On Rise Time	$V_{DD} = 15 V$ , $I_D = 1 A$ ,		20	32	ns
t <sub>d(off)</sub>	Turn–Off Delay Time	$V_{\text{GS}} = 4.5 \text{ V}, \ \text{R}_{\text{GEN}} = 6 \ \Omega$		60	96	ns
t <sub>f</sub>	Turn–Off Fall Time			30	48	ns
Qg	Total Gate Charge	V 45.V 1 55.1		32	51	nC
Q <sub>gs</sub>		$V_{DS} = 15 \text{ V}, I_D = 50 \text{ A}, V_{GS} = 4.5 \text{ V}$		10		nC
Q <sub>gd</sub>	Gate–Drain Charge			9		nC
Drain-S	ource Diode Characteristics a	Ind Maximum Ratings				
ls	Maximum Continuous Drain-Source				50	А
V <sub>SD</sub>	Drain–Source Diode Forward Voltage	$V_{GS} = 0 V$ , $I_S = 25 A$ (Note 2)		0.8	1.3	V

1. Maximum continuous current is limited by the package.

2. Pulse Test: Pulse Width < 300 $\mu$ s, Duty Cycle < 2.0%



FDP7042L Rev C(W)



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